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(54) Controlling lighting system

(57) To control the energisation of a plurality of electric lamps collectively providing, when energised, artifical illumination in a common space or enclosure, the current through each lamp (L1c) or each group of such lamps is controlled by means of a triac (TR1), the gate electrode of which is set to a high or low level for switch on or switch off in accordance with the output of a light sensitive means (92) responding to the daylight component of illumination and light supplied from the lamp (L1c). Switch on and switch off of triac (TR1) takes place at sampling intervals determined by an input conditioning circuit (86) and timing circuit (68) providing sampling pulses at 30 minute intervals but capable of being initiated at any time by a manually operable means (S1). Flip-flop circuit (85) is settable between first and second states for switch on and switch off of triac (TR1) through driver and power supply unit (83) in response to the output from light sensitive means (92) fed through switch decoding circuit (95).

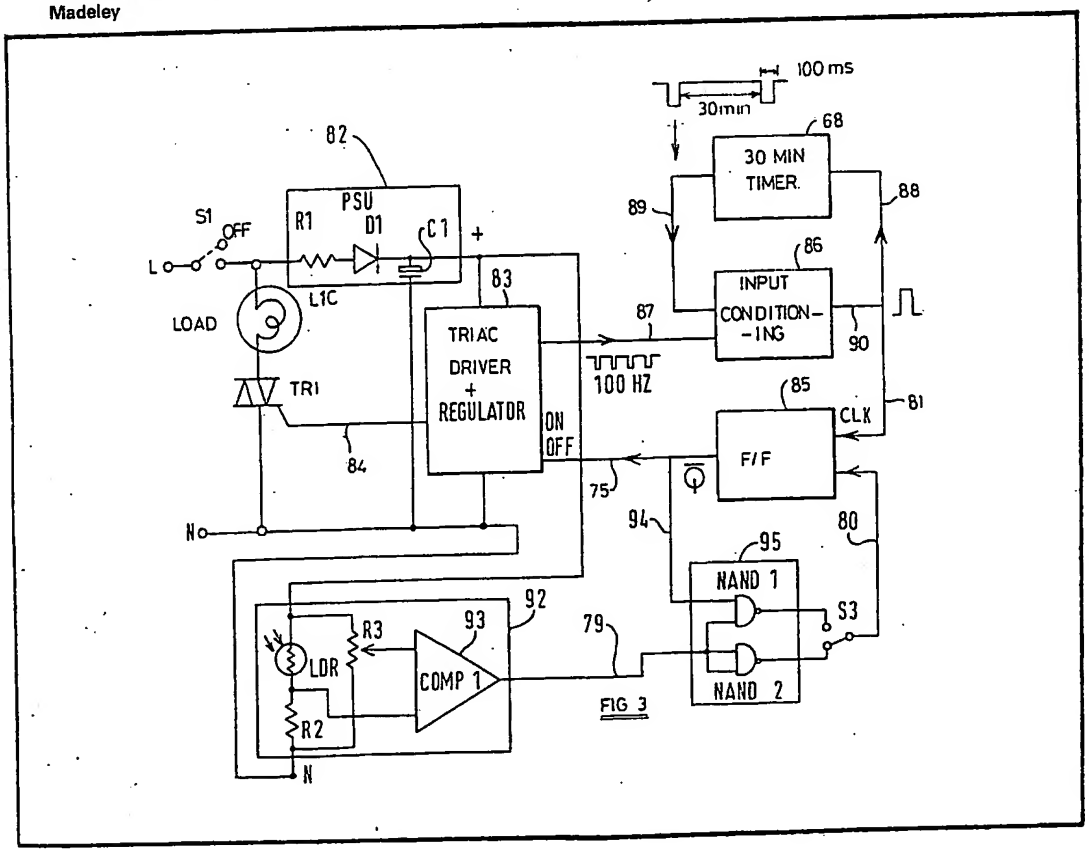

FIG 3

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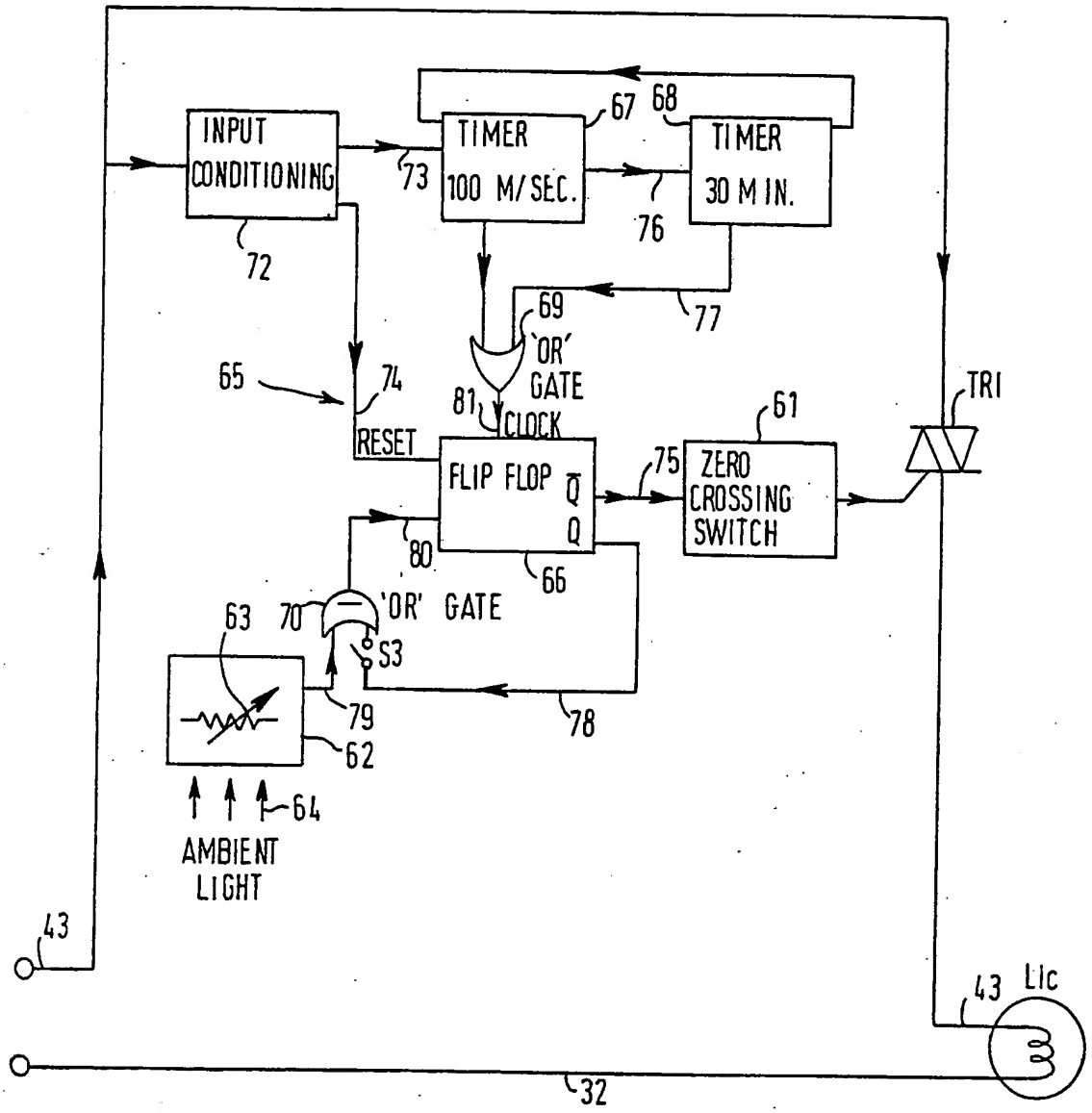
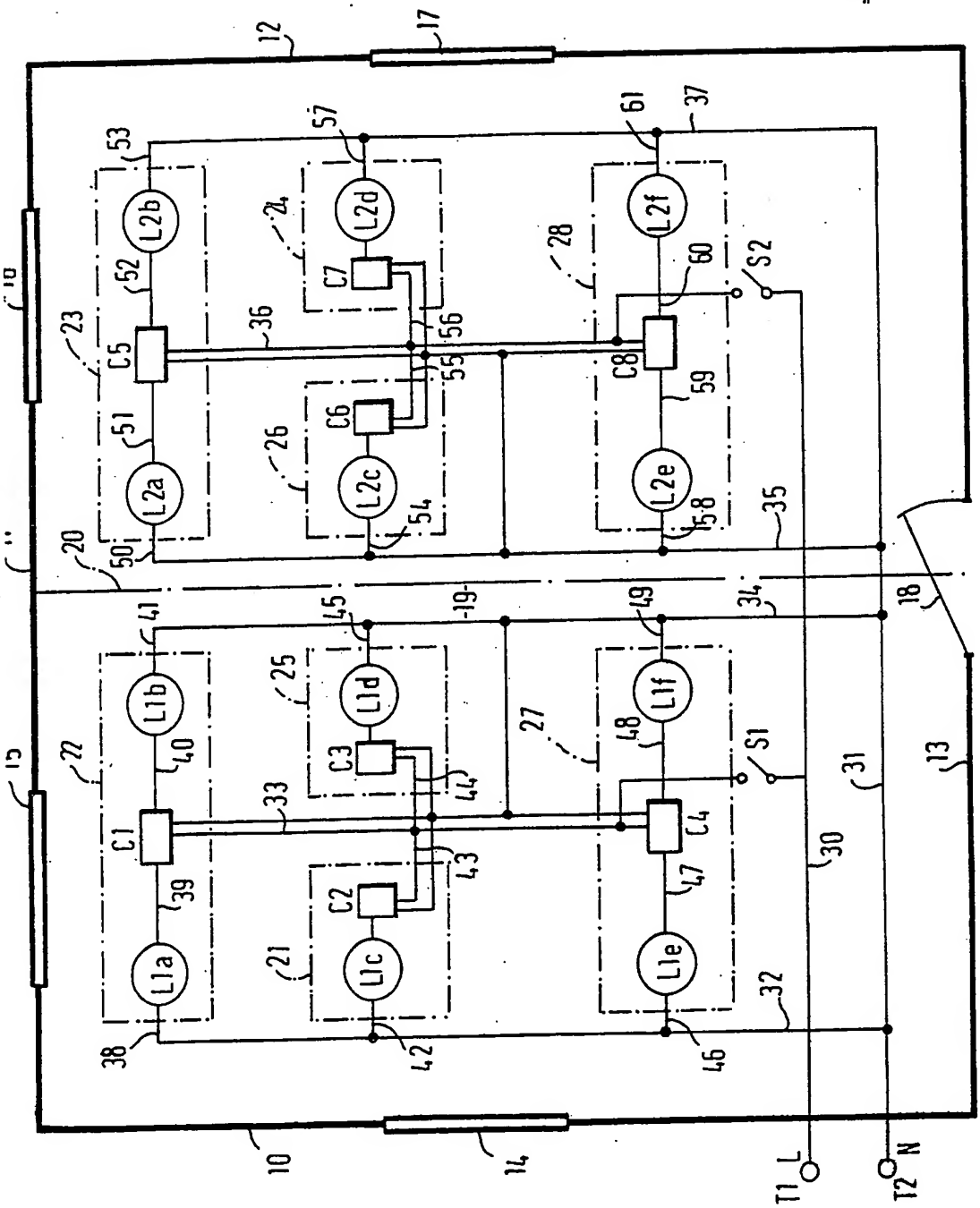

INPUT CONDITIONING
72
TIMER 100 M/SEC.
73
67
68
TIMER 30 MIN.
76
77
69
'OR' GATE
81
CLOCK
65
74
RESET
FLIP FLOP Q Q̄
80
66
75
ZERO CROSSING SWITCH
61
TRI
'OR' GATE
70
63
S3
79
62
78
64
AMBIENT LIGHT
43
43 Lic
32

FIG 1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58
59
60
61
L1a
L1b
L1c
L1d
L1e
L1f
L2a
L2b
L2c
L2d
L2e
L2f
C1
C2
C3
C4
C5
C6
C7
C8
S1
S2
T1 L
T2 N

FIG 2

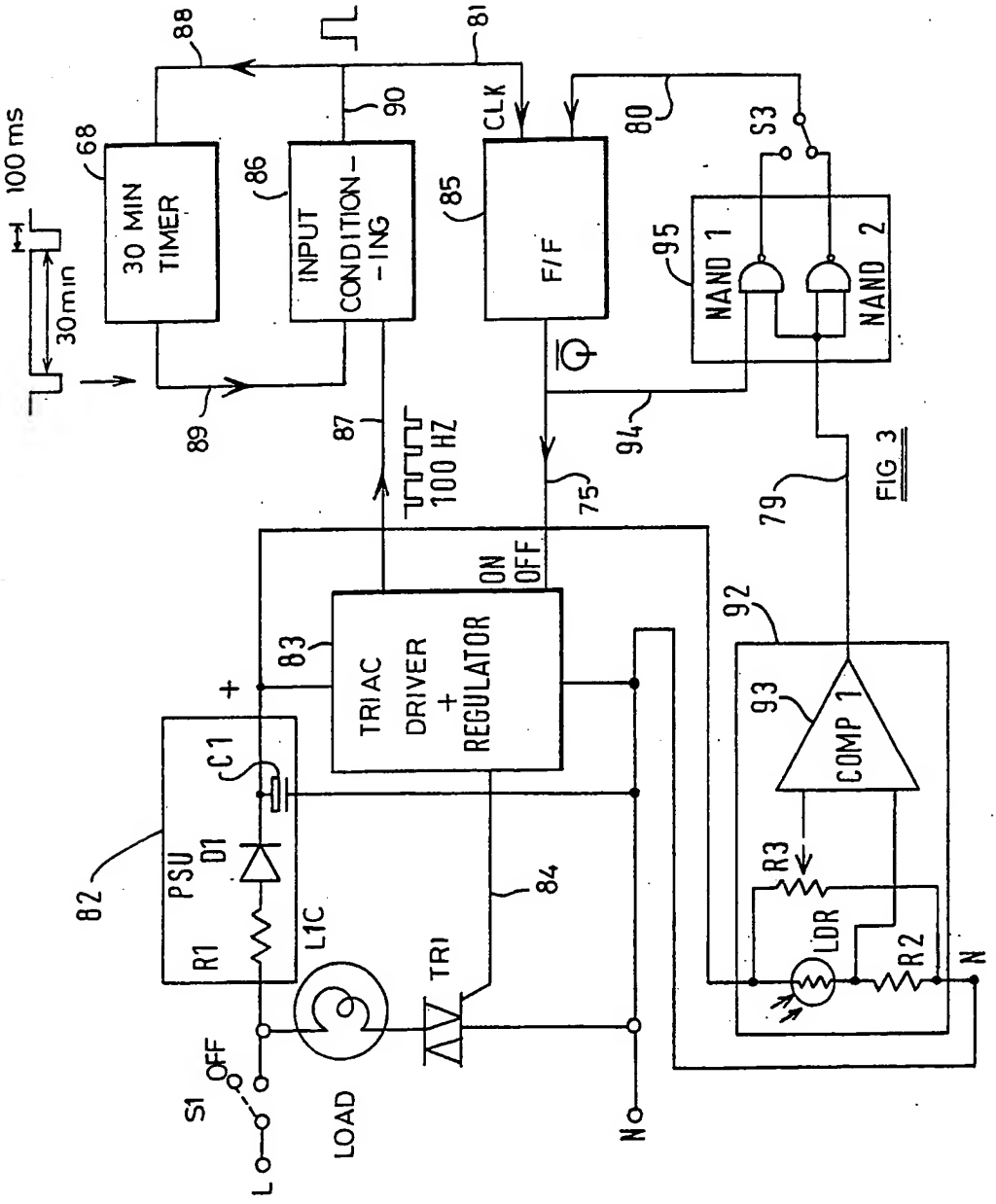
100 ms
30min
68
30 MIN TIMER
86
INPUT CONDITION-ING
85
F/F
CLK
88
90
81
80
S3
95
NAND 1
NAND 2
89
87
100 HZ
94
75
79
ON
OFF
92
83
TRIAC DRIVER + REGULATOR
93
COMP 1
+
C1
82
PSU
D1
R1
L1C
TRI
84
R3
LDR
R2
N
S1
OFF
LOAD
L
N

FIG 3

SPECIFICATION

Method of and control means for controlling the energisation of a lighting system

This invention relates to a lighting system (herein referred to as being of the kind specified) and comprising a plurality of electric lamps collectively providing, when energised, artificial illumination in a common space or enclosure (herein called the illuminated space), and circuit means providing a connection between an electrical power supply and the lamps, and is concerned with the provision of a method of controlling and a control means for controlling the energisation of the lamps.

It is common practice in a lighting system of the kind specified to provide, in the circuit means, a plurality of manually operable switches each of which controls energisation of those lamps which provide the main illumination in a respective one of the zones of the illuminated space which collectively make up the whole. Illuminated space is usually divided geometrically into such respective zones. Typically, if the space is rectangular as viewed in plan the zones themselves may be subordinate rectangles as viewed in plan defined by boundary lines parallel to the shorter dimension of the main rectangle and spaced apart at intervals along the length of the longer dimension of the main rectangle.

This provides the occupants of the illuminated space with the ability manually to control the intensity of artificial illumination in one zone compared with that in another, by operating the appropriate switches. Often where the illuminated space is also illuminated naturally by daylight through windows in its lateral boundary walls, or possibly by skylights, the distribution of daylight would ideally require some of the lamps to be switched on before others as the day darkens and similarly would require other lamps to be switched off earlier than the remaining ones as the day gets lighter.

The lamps which ideally should be switched on or off in advance of the remainder are, however, disposed in zones related to the intensity of illumination provided by daylight differing from the geometrically determined zones and, therefore, control by the manual switches in respective geometrically determined zones is at best a compromise, and often not at all related to the ideal requirement, yet the latter is becoming of increasing importance as the cost of energy rises.

In existing systems a great deal of expense would often be entailed in replacing the existing circuit means, i.e. the wiring to the lamps, so that the respective manually operable switches control lamps or groups of lamps situated in zones determined by the intensity of illumination provided by daylight rather than determined by geometrical convenience, and such cost would often far outweigh the saving to be achieved by control in accordance, or more in accordance, with the ideal referred to above.

The object of the present invention is to provide a method and a control means which enables the ideal to be achieved or approached more nearly while minimising the cost of converting existing lighting systems.

From one aspect the present invention resides in a method of controlling the energisation of a plurality of electric lamps collectively providing, when energised, artificial illumination in a common space or enclosure (the illuminated space) also illuminated naturally by daylight under daylight conditions, said method comprising generating an electrical controlling signal (herein called the daylight signal) in response to the intensity of illumination in at least one zone (herein called the light controlled zone) of the illuminated space, and which varies between a first value and a second value according to whether the daylight is relatively weak or strong, using the daylight signal to switch the lamp or group of lamps providing the main artificial illumination in the light controlled zone on or off as the controlling signal falls below the first value or rises above the second value by providing a switch means controlling such lamp or group of lamps selectively relatively to the remainder and which is responsive to the daylight signal, this operation being conducted in accordance with a predetermined sampling program capable of being overridden by manual operation establishing sampling at any time.

It is less usual, especially in factories or commercial premises, for lamps to be switched on prematurely as daylight grows weaker than for lamps to remain switched on unnecessarily as daylight strengthens after they have been switched on manually, for example when work is started early in the day.

Accordingly, the method of the invention may in suitable cases be applied only to switching off of the lamp, or group of lamps, in the light controlled zone or each light controlled zone as the daylight improves. It is contemplated, however, that the method could be applied when required both to the switching on of lamps or groups of lamps and its or their switching off.

An advantage of the method is that the intensity of illumination in the light controlled zone (or each such zone), and the resultant switching on or switching off of the lamp or group of lamps concerned, when effected by way of a sampling procedure (preferably conducted at regular intervals of time), not only reduces the number of switching on and off operations and therefore is contributory to the long life of the components used in performance of the method, but also enables the first value and the second value of the daylight signal to be selected to be closer numerically to each other than would otherwise be the case. This avoids unnecessary and repeated switching on and off due, for example, to short term fluctuations in the intensity of the daylight illumination due to cloud or other effects.

Moreover, by manually overriding the

preselected sampling intervals determined by timing means provided in carrying out the method, in suitable cases by the manually operable switch provided for switching on all of the lamps or the lamps in a "geometrically determined" zone, the needs of the user are fully met without additional wiring complications.

From a further aspect the invention resides in the provision in or for a lighting system of the kind specified of a control means comprising at least one controller including switch means (herein called light controlled switch means) responsive to an electrical input signal for switching on and off the current supply to a respective lamp or group of lamps providing illumination in a zone (herein called the light controlled zone) of the illuminated space, light sensitive means for sensing the light intensity at a selected place in the light controlled zone and providing an electrical output signal (herein called the daylight signal) for controlling the light controlled switch means to switch this on when the daylight signal has a first value, or off when the daylight signal has a second value, respectively corresponding to relatively weak and strong daylight, sampling means for establishing a succession of sampling times at which the light controlled switch means is caused to be responsive to the daylight signal to determine whether a switch on or switch off condition should be established, and means for establishing a further sampling time in response to a manually performed operation.

As in the case of the method, the light controlled switch means may be arranged to respond only to the second value, thus providing switch off facilities, or may be arranged to respond to both the first and second values thus providing switch on and switch off facilities.

Again, preferably, but not essentially, the manually operable means may comprise a switch provided for controlling all of the lamps or a fractional number of lamps providing illumination in "geometrically defined" zone or zones.

The invention will now be described by way of example with reference to the accompanying drawings wherein:—

Figure 1 is a circuit diagram of one embodiment of controller forming part of the control means in accordance with the present invention;

Figure 2 is a schematic diagram showing a lighting system of the kind specified and a control means in accordance with the invention applied thereto;

Figure 3 is a circuit diagram of a further embodiment of a controller forming part of the control means in accordance with the present invention.

Referring firstly to Figure 2, the lateral walls 10 to 13 of the room which forms a space to be illuminated artificially have windows 14 to 17 distributed as shown therearound but the wall 13 has no window and is provided typically with an unglazed entrance door 18.

Artificial illumination for the space indicated generally at 19 is provided by twelve lamps L1*a* to L1*f*, L2*a* to L2*f* arranged in rows each consisting of three lamps and extending parallel to the shorter lateral walls 10 and 12.

Lamps L1*a* to L1*f* provide the main illumination in a "geometrically" defined zone bounded by the wall 10, part of the wall 11, part of the wall 13 and a notional boudary 20, and are collectively controlled as to their energisation by a switch S1 while lamps L2*a* to L2*f* provide the main illumination in a second "geometrically" defined zone bounded by the wall 12, the remaining part of 11, the remaining part of 13 and the notional boundary 20, energisation of these lamps being controlled by switch S2.

It may well be required, depending upon the daylight conditions and the amount of light admitted by windows 14 to 17, to control lamps which are situated adjacent to the windows in a manner such that these are switched on and off at times different from those at which the lamps which are not adjacent to windows are switched on and off for reasons hereinbefore explained. For this purpose energisation of the lamps is controlled selectively in respective light zones which are identified by chain line boundaries 21 to 24 (where energisation is required to be cut off earlier under increasing daylight conditions and energised later for decreasing daylight conditions) than for the lamps contained in the remaining zones 25 to 28.

It will be noted that it may be convenient to sub-divide the space to be illuminated into light zones in which the main artificial illumination is furnished by a single lamp as, for example, 21, 24, 25, 26. In other cases it may be convenient to sub-divide the space into light zones in which the main illumination is furnished by a group of lamps, for example two, as in the case of zones 22, 23, 27 and 28. In general terms the question of whether control is to be applied to an individual lamp, or to a group of lamps, will be determined primarily on consideration of whether it is functionally appropriate to include a group of lamps by reason of the intensity of illumination being more or less uniform over that zone for any given daylight condition, and on consideration as to whether a single controller can control a group of lamps without too much complication in modifying the existing wiring, or whether it will be simpler and less costly to provide individual controllers for respective single lamps.

It will be noted that the switches S1 and S2 each control lamps in respective "geometrical" zones but which are also lamps contained in light zones having different characteristics, e.g. zones which are adjacent to windows such as 21, 22, 23, 24 and zones which are non-adjacent to windows, e.g. 25, 26, 27 and 28.

In order to obviate or reduce the shortcomings of simple manual control, but without rewiring the whole circuit means connecting the electrical power supply fed in terminals T1 (line) and T2 (neutral) to the lamps and represented by main conductors 30 to 37 and branches therefrom 38

to 61, the control means comprising individual controllers C1 to C8 are provided for the groups of lamps or individual lamps in respective light zones as shown.

With the switches S1 and S2 in the "on" position, each of these controllers provides the establishment or cutting off of energisation from the group of lamps or individual lamps in the light zone concerned as a function of the intensity of illumination sensed by the controller in that zone.

This can be effected with very little disturbance to the existing wiring simply by connecting the controllers concerned in effect in series in one of the branch conductors through which current would otherwise be supplied to the lamp or each lamp in a group and providing a separate single line connection to the neutral side of the supply.

Consequently conversion of a lighting system of the kind specified controlled by the method and by the control means of the present invention does not involve any significant rewiring of the main circuit, not does it involve the transmission of complex signals along or through the network of existing wiring requiring the provision of sophisticated signal generator means.

One form of controller embodied in the control means is illustrated in Figure 1. It is assumed for convenience in the following description that the controller is applied to the lamp L1*c*, but it may be applied to other lamps or groups thereof. The separate connection of the controller to the neutral side of the supply, necessary to provide power to the various units, is omitted for simplicity.

In this embodiment the controller comprises a switch which is responsive to an input current to establish or cut off the supply of current through the conductor 43 to the lamps L1*c*, such switch conveniently being in the form of a triac TR1, the trigger electrode of which is supplied with current through a zero crossing switch 61 providing for interruption of the main current in the conductor 43 at zero value points of the current of the A.C. current wave.

The input to the zero crossing switch (determining the current signal applied to the trigger electrode of TR1) is basically controlled by the output from the light sensitive means 62 such as a photo cell or photo transistor circuit including setting means indicated diagrammatically at 63 to enable the level of the output signal to be varied as a function of the input ambient light indicated diagrammatically at 64.

In the particular application now envisaged the light sensitive means 62 may be mounted near the ceiling adjacent to, or somewhat laterally offset from, the lamp to be controlled, or from any lamp of the group thereof. Its light receiving aperture may be directed downwardly to receive reflected light from the surface of the floor, furniture or other objects having upwardly presented surfaces, but preferably being selected in position and orientation to receive little or no light directly from the lamp itself. This condition may be contrived by the use of opaque or nearly opaque lampshades intercepting such direct light rays, or by siting the light sensitive means above the level of the lamps.

Application of the electrical signal derived from the light sensitive means 62 to the zero crossing switch 61 is in effect contrived through the intermediary of a sampling means 65, comprising a flip-flop or bistable circuit 66, timer circuits 67 and 68 for "clocking" the circuit 66 to establish the sampling times, OR gate 69 and OR gate 70, and mode selector switch S3 to provide selection of uni-directional switching (switch off under increasing daylight) or bi-directional switching (switch on and off respectively under decreasing and increasing daylight).

The invention will be best understood by describing the manner of operation of this circuit which is as follows. When one of the manually operable switches, S1 in the present case, is closed, conductor 43 is connected to the live side of the supply and feeds an input signal to input conditioning unit 72, the function of which is to provide outputs of a suitable current and voltage levels to the input line 73 of a short duration timer unit 67 (typically providing a single pulse 100 milliseconds after receiving an input signal) and also to provide an input to the reset line 74 of the flip-flop circuit 66, the output of which on line 75 immediately goes "high".

The 100 millisecond timer provides a pulse on line 76 to start the long duration, e.g. 30 minute, timer 68 running 100 milliseconds after the input signal is fed to the timer 67. After a further interval of 30 minutes, the timer 68 times out and supplies a further input signal to re-start the short duration timer 67 and the cycle is repeated whilst the switch S1 remains closed.

With the mode selector switch S3 in the open position (providing bi-directional switching) then, when line 75 goes "high", the output from zero crossing switch 61 fires the triac TR1 into the "on" condition. If the input on line 79 from the light responsive means 62 is low (weak daylight conditions) the output of the OR gate 70 remains low and the level of input on line 80, which controls the state of the flip-flop circuit when a timer pulse is fed to the flip-flop circuit from the OR gate 69, remains low, so that the flip-flop circuit is held in a condition in which the output on line 75 remains high.

When the long duration timer 68 times out, and supplies a pulse on line 77 to one of the inputs of OR gate 69, the input to the flip-flop circuit on line 81 clocks or samples this again, i.e. puts it in a condition in which it can respond to a high or low level on line 80. If the daylight level is still weak, line 80 will continue to be low and a high value of output will be retained on line 75, and the triac TR1 will remain conducting.

If, however, the light sensitive means 62 is now sensing a relatively strong daylight condition, line 79 will have gone "high" as will also line 80 and consequently, on clocking will produce a low signal value on line 75 changing the zero crossing switch 61 to provide an "off" signal therefrom to

the triac TR1 which is rendered non-conducting hence de-energising lamp L1*c*.

Should, however, the lamp be switched off, and before the next 30 minute sampling time is established by timer 68, daylight conditions weaken, e.g. due to cloud or some other cause, the user can re-establish energisation of lamp L1*c* by opening and closing manual switch S1. This will cause input unit 72 to apply a signal to the reset line 74 and the high level of signal will be restored on line 75. Timer 68 will again start to run and the light condition will again be sampled after a 30 minute interval. It will be understood that this manual sampling of the status can be effected at any time, i.e. in between the sampling times occurring at 30 minute intervals.

It will be appreciated that since the light sensitive means 62 will be observing reflected light from the floor or an upwardly presented surface in the light controlled zone concerned, e.g. L1*c*, it will in effect be supplied with light from three sources, namely

(a) daylight through the window 14,

(b) light from the lamp L1*c* (if already energised) and forming the main source of artifical illumination in the light zone 21, and

(c) some light from adjacent lamps (if energised) such as L1*a*, L2*e*, L1*d*.

The condition which brings about switching off of the lamp L1*c* under conditions of increasing strength of daylight must therefore be an intensity of illumination in the light zone 21 higher by a pre-selected amount than that produced by (b) together with the supplement produced by (c).

The condition which produces switching on of lamp L1*c* must be intensity of illumination in light zone 21 below that which would be produced by (b) alone (under conditions of natural darkness) but above that produced by (c) without (b), otherwise energisation of L1*a*, L1*d*, L1*e* and any other lamps making a contribution could inhibit L1*c* from ever becoming energised.

In practice the position, orientation and directional characteristics of the light receiving means of the light sensitive means 62 may be so arranged that, so far as artifical illumination is concerned in the zone 21, the contribution from lamp L1*c* is very much stronger than the contribution made by L1*a*, L1*d*, L1*e* or other lamps so that these latter collectively do not affect operation of controller C2 to any significant extent. Under these conditions any variation in the output from OR gate 70 is brought about predominantly by variation in the strength of the natural light. Accordingly one is then able to simplify the parameters on the footing that L1*c* must be switched on when intensity of illumination in zone 21 is less than would be provided by L1*c* alone when energised, and must be switched off when intensity of illumination in zone 21 is some predetermined point above the level provided by L1*c* alone. The adjustment means 63 enables the controller to be pre-set at installation to suit the particular daylight charactistics of the light zone concerned in a simple manner providing great adaptability for the control means to existing lighting systems.

Ideally, the switch on level and the switch off level should be as close to each other as is consistent with stable operation, i.e. avoidance of repeated on and off switching. The provision of the sampling means 65 to a large extent inhibits any difficulties and allows the switch on and switch off values on the line 80 to be set closer together than would otherwise be the case by confining switching to sampling periods, say at 30 minute intervals, with the possible intervention of manual sampling by operation of switch S1 or switch S2 as already described.

Switch S3 enables the user to select the mode of operation. With switch S3 closed (uni-directional switching) the lamp L1*c* will be switched off as daylight grows stronger (level on line 80 increasing from line 79). The flip-flop circuit has an output $\overline{Q}$ at its terminal connected to line 78 which is the complement of the output $\overline{Q}$ at its terminal connected to line 75 and this output $\overline{Q}$ fed through OR gate to line 81 prevents the signal level on line 81 going low as daylight weakens. Therefore the controller does not switch L1*c* on as daylight weakens.

With the switch S3 open (bi-directional switching) increases and decreases of level on the line 80 are determined only by the output on line 79 and the controller will operate both to switch off and switch on the lamp L1*c* at the sampling intervals with the possible intervention of "manual" sampling by the use of the switch S1.

When a controller is required to control a group of lamps, these may be connected in parallel with each other and such parallel connected group in series with a triac such as TR1.

Manual control of sampling may of course be effected by use of switch S2 for lamps in light zones 23, 24, 26 and 28.

Referring now to the embodiment shown in Figure 3, components corresponding to those of Figure 1 are designated by like references and the preceding description is to be deemed to apply.

The remaining units have generally similar functions to those of Figure 1 and overall the circuit operates in the same manner but there are some differences as now referred to. The connections to the neutral side of the supply are shown.

A unit 83 comprising a triac driver including a power regulator circuit is energised from a power supply unit 82 comrising components R1, D1, C1, controlled by the manually operable switch S1. The driver provides a controlling output to the gate electrode of triac TR1 at a high (1) level on line 74 to switch the current on through the lamp L1*c* or at a low (0) level on line 74 to switch this current off.

As before, the level of the voltage on the line 84 connected to the triac is determined by the level on input line 75 and a bistable (flip-flop) circuit 85 provides an output $\overline{Q}$ on line 75 which is high (1) for switch on of triac TR1 and low (0) for switch off of triac TR1 and is changed from

one state to the other dependent upon the input on line 80, (0) for lamp on and (1) for lamp off. Switching takes place only at certain sampling times determined by the incidence of a clock or sampling pulse on line 81.

Sampling pulses are generated by an input conditioning circuit 86 receiving a train of pulses from unit 83 through line 87. After switch on at switch S1 the first of these pulses initiates a 30 minute timer 68 by an input on line 88 and the output from the timer on line 89 inhibits generation of further pulses, typically at 100 Hz, on the input conditioning unit output line 90 and hence on line 81. Thus, the flip-flop circuit is subjected to sampling every 30 minutes.

Unit 92 which is a light sensitive means comprises a light dependent resistor LDR in series with a resistor R2, and a comparator 93. The latter is settable by varying the position of the slider of R3 to adjust the input level to one input of the comparator, the level of the other input being determined by the conditions to which resistor LDR is subjected. Under dark conditions the resulting output on line 79 is high (1) and under light conditions the output on line 79 is low (0).

The output on line 79 and an output from line 75 are fed to a switch decoding unit comprising two NAND gates, NAND 1 and NAND 2, connected as shown.

With switch S3 in the lower, that is on/off position, and a (1) on line 79 (dark conditions), the NAND 2 having two 1's on its inputs will have an (0) on its output. This (0) appearing on line 80 results in an output on line 75 putting the triac TR1 into the conducting state and switching the lamp L1*c* on. When line 79 goes low (0), that is when light increases on the LDR, the NAND 2 inputs go to (0), and the output goes to (1), resulting on a (1) on line 80, which in turn turns the triac TR1 off.

With the switch S3 in the off position, and assuming that it is dark and that power has been applied to the complete unit via the main switch S1, the following events will take place. An input conditioning signal applied to the flip-flop will clock this circuit and, because initially line 80 is at (0), there will be an output on line 75 turning the triac TR1 on. Line 94 and the upper input of NAND 1 therefore will have a (1) on it.

Because the ambient light is low, the comparator will provide a (1) on line 79 which will appear on the other input of the NAND 1, the output of which will therefore be (0), so that (0) appears on line 80. This will therefore act as the reference input to the flip-flop 85 for the next and successive sampling pulses maintaining the output, line 75, at (1) and the triac on.

As the light level increases, the comparator output to line 79 will change to (0). A (1) will then appear on line 80, and at the next sampling input to the flip-flop 85 this will change the output state of line 75 to (0), so turning the triac TR1 off. Under these conditions line 94 will go low (0) so applying (0) to the upper input of NAND 1 and, therefore, regardless of what happens to the comparator output to line 79, the NAND 1 will maintain an output (1) on line 80. Triac TR1 will thus be maintained in the off state.

The user can, however, return switch S3 to the lower position (on/off mode) and then the triac will be switched on or off according to whether LDR is subjected to dark or light conditions at the next sampling time which, again, can be artificially initiated by the user moving switch S1 to the off position and then closing it again.

Claims

1. A method of controlling the energisation of a plurality of electric lamps collectively providing, when energised, artifical illumination in a common space or enclosure (the illuminated space) also illuminated naturally by daylight under daylight conditions, said method comprising generating an electrical controlling signal (herein called the daylight signal) in response to the intensity of illumination in at least one zone (herein called the light controlled zone) of the illuminated space, and which varies between a first value and a second value according to whether the daylight is relatively weak or strong, using the daylight signal to switch the lamp or group of lamps providing the main artifical illumination in the light controlled zone on or off as the controlling signal falls below the first value or rises above the second value by providing a switch means controlling such lamp or group of lamps selectively relatively to the remainder and which is responsive to the daylight signal, this operation being conducted in accordance with a predetermined sampling programme capable of being overriden by manual operation establishing sampling at any time.

2. In or for a lighting system of the kind specified, a control means comprising at least one controller including switch means (herein called light controlled switch means) responsive to an electrical input signal for switching on and off the current supply to a respective lamp or group of lamps providing illumination in a zone (herein called the light controlled zone) of the illuminated space, light sensitive means for sensing the light intensity at a selected place in the light controlled zone and providing an electrical output signal (herein called the daylight signal) for controlling the light controlled switch means to switch this on when the daylight signal has a first value, or off when the daylight signal has a second value, respectively corresponding to relatively weak and strong daylight, sampling means for establishing a succession of sampling times at which the light controlled switch means is caused to be responsive to the daylight signal to determine whether a switch on or switch off condition should be established, and means for establishing a further sampling time in response to a manually performed operation.

3. A control means as claimed in claim 2 wherein the light controlled switch means is arranged to respond only to the second value,

thus providing switch off facilities, or is arranged to respond to both the first and second values thus providing switch on and switch off facilities.

4. A control means as claimed in either of claim 2 and 3 wherein the manually operable means comprises a switch provided for controlling all of the lamps or a fractional number of the lamps providing illuminations in "geometrically defined" zone or zones.

5. A control means as claimed in any one of claims 2 to 4 wherein the light controlled switch means comprises a gate controlled semi-conductor switch, the input signal being applied to the gate, and being supplied from a bistable circuit settable into a first state to establish switch on of the lamp or group thereof and a second state to establish switch off of the lamp or group thereof in response to a signal fed to the bistable circuit from the light sensitive means.

6. A control means as claimed in claim 5 wherein the bistable circuit is settable into either of its first or second states only at times determined by incidence of a sampling signal at a sampling input to the bistable circuit, and timing means connected to the bistable circuit sampling input is provided to generate the sampling signals.

7. A control means as claimed in claim 6 wherein the timing means is arranged to initiate generation of the sampling signals in response to operation of the manually operable means.

8. A method of controlling energisation of a plurality of electric lamps substantially as herein described with reference to the accompanying drawings.

9. A control means for a lighting system of the kind specified substantially as herein described with reference to and as shown in Figures 1 and 2 or Figure 3 of the accompanying drawings.

10. A lighting system substantially as herein described with reference to and as shown in Figures 1 and 2 or Figure 3 of the accompanying drawings.

11. A method including any novel feature or novel combination of features disclosed herein and/or as shown in the accompanying drawings.

12. A control means or lighting system including any novel feature or novel combination of features disclosed herein and/or as shown in the accompanying drawings.

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